

Attitudes of Suburban Kansan Parents Regarding School-Required Immunizations and the Influences of the Coronavirus Pandemic

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ABSTRACT

Introduction. Understanding suburban, Kansas parental attitudes and adherence of recommended childhood vaccination schedules adopts a new level of importance in the era of the SARS-CoV-2019 (COVID-19) pandemic. With hopes for release of a safe and effective COVID-19 vaccine underway, understanding parental perception of vaccines is important to design successful vaccination interventions.

Methods. A web-based, cross-sectional survey was administered to approximately 900 parents in Johnson County, Kansas during the summer of 2020. Pearson chi square and Mann-Whitney U tests were utilized to assess the attitudes of Kansas parents towards a potential addition of the influenza vaccine to the required list for K-12 students and furthermore, their general perception of vaccinations, and the impact of COVID-19 on those beliefs.

Results. A total of 179 parents responded. Fifty-one percent (n = 92) were in favor of adding the influenza vaccine to the mandatory list (Pro-Addition). Anti-Addition parents had significantly higher levels of distrust (2.1, $p < 0.001$) and were significantly more concerned about vaccine adverse effects. When presented with a hypothetical situation in which a “safe and effective” COVID-19 vaccine was available, 24% of Anti-Addition parents indicated they would receive the vaccine or obtain it for their children (21 people, $p < 0.001$).

Conclusions. Kansas suburban parents were split on their attitudes towards the addition of the influenza vaccine to the required list for children and the effects of the pandemic. Follow-up qualitative studies of Anti-Addition parents are critical for successful vaccine distribution and coverage in the communities. *Kans J Med* 2021;14:116-120

INTRODUCTION

Achieving higher vaccine coverage rates among school-aged children has been a topic of high priority among health professionals for decades. With vaccine exemptions due to personal parental beliefs on the rise,¹ achieving safe levels of vaccine coverage is becoming more difficult. Common areas of hesitation among parents are in relation to necessity, efficacy, and potential adverse effects of the vaccine.² One example of the contentious nature of mandatory vaccines was the public backlash following the Kansas State Department's decision to require hepatitis A and meningococcal vaccines in 2020 for grades K-12.³ This new addition has been met with criticism from anti-vaccine groups, such as Kansans for Health Freedom, protesting publicly and online throughout cities in Kansas.⁴

Influenza vaccination coverage among children serves as an important example of the public health sector shortcomings. The Healthy People 2020 (HP2020) set a national goal of 80% coverage for childhood influenza immunization rates. Forty-nine out of 50 states fell short of this, with Kansas reaching 63.3% coverage.^{5,6} Currently, the influenza vaccine is not on the Kansas School Immunization Requirement list.⁷ While required vaccine lists have been shown to increase vaccine coverage significantly among their target population,⁸ such public health measures may erode public confidence if not carried out in a tactful manner. As such, it is critical to understand parental belief systems and attitudes regarding vaccines, and their mandatory versus elective status, prior to implementing such initiatives.

Recent National Immunization Surveys (NIS) released by the U.S. Centers for Disease Control and Prevention (CDC) showed anti-vaccine parents are often Caucasian, college-educated families that make over \$75,000/year.^{9,10} To understand an upper socioeconomic population, such as the CDC described, this study assessed, via survey, the attitudes of suburban Kansan parents toward a potential addition of the influenza vaccine to the required list for children. Additionally, given the current novel COVID-19 pandemic and societal hopes for a safe and effective vaccine,¹¹ data regarding parental attitudes and openness toward such a vaccine are crucial. Even the best vaccine is only effective if people receive it. As such, we also assessed if parents would obtain for themselves and their families a COVID-19 vaccine that was “safe and effective”.

Parents deemed to be suburban for this study had children attending schools in a Johnson County school district. Johnson County parents were selected as our sample population to represent a suburban population because they are the wealthiest county in Kansas (Median Household Income = \$89,087), while also having a predominant Caucasian (86.6%) and educated population (96% High school graduate or higher).¹² This population was crucial to study as they are less likely to be affected by financial and sociodemographic barriers to vaccine hesitancy,¹³ but still were not often adherent to vaccine guideline, per the NIS from the CDC.^{9,10}

The most recent data indicated Johnson County had a 58% total population influenza vaccination rate.¹⁴ If breakthroughs in vaccination rates can be achieved among a highly populated, suburban county such as this, Kansas could come closer to reaching the new Healthy People 2030 goal of 70% coverage among children.¹⁵

This study sought to assess the attitudes of Kansas suburban parents towards: (1) the addition of the influenza vaccine to the required list, and (2) their likelihood to obtain, if it existed, a “safe and effective” COVID-19 vaccination for their children.

METHODS

This study was reviewed by the University of Kansas Medical Center Institutional Review Board.

Recruitment and Survey Distribution. Subjects were recruited via four Parent Teacher Organization (PTO) presidents through e-mail. Our team e-mailed survey invitations to PTO presidents who then distributed them through group e-mails, social media, and member newsletters to parents in the respective district. There were no financial incentives given to PTOs or participants. All respondents

were asked to complete the survey once and in its entirety. Surveys and associated consent forms were provided in both English and Spanish. A one-month window of time was allotted for data collection during the summer of 2020.

Survey Development and Data Analysis. The survey (see Appendix online only at journals.ku.edu/kjm) was adapted from the previously validated Parent Attitudes about Childhood Vaccines survey (PACV).^{16,17} PACV items that were not relevant to the present study (e.g., Have you ever taken a non-medical exemption for any or all of your children’s shots?) were removed. The survey also incorporated four items from the Brief Health Literacy Screening Tool (known as the BRIEF), a health-literacy self-assessment.¹⁸ Our resultant survey included 14 out of the 27 original PACV items, 4 BRIEF items, and 10 items our team created. The 10 created items were designed to acquire data specific to parental attitudes towards the addition of the influenza vaccine to the required list for children and to obtain information on parental willingness to receive the coronavirus vaccine.

Study data were collected and managed using REDCap® (Research Electronic Data Capture) electronic data capture tools.¹⁸ REDCap® is a secure, web-based software platform designed to support data capture for research studies, providing an interface for validated data capture.^{19,20}

Inclusion criteria for the survey was being the parent of a child enrolled in a Johnson County school district. Since Johnson County is the wealthiest county in Kansas,¹² while also having a large population of Caucasian, educated individuals, our team felt they would be a good representation to explore the CDCs NIS results among parents further.

When discussing differences in income among suburban parents, and its effects on parental attitudes towards vaccines, high-income parents are considered to have an annual household income greater than \$75,000 to allow for direct comparisons with prior CDC findings.^{9,10} Therefore, low-income parents are considered to be less than \$75,000.

Categorical variables were analyzed using a Pearson chi square test looking at the differences in proportions; whereas 5-Point Likert scales were treated as ordinal data and analyzed via a Mann-Whitney U test. All analyses were conducted using SPSS Statistics v. 26. In all cases, p values of < 0.05 were considered statistically significant.

Respondents were stratified into one of two subgroups, Pro-Addition parents or Anti-Addition parents. A Pro-Addition parent responded in favor of the addition of the influenza vaccine to the list of required vaccines for children. An Anti-Addition parent was against the addition.

The demographic characteristics were not included if they had less than five respondents under a category. The following categorical characteristics were not included due to lack of respondents: Race: Black/African American, Asian/Pacific Islander, Hispanic or Latino, Other; Marital Status: Widowed; Type of Doctor: D.O., I don’t have a doctor, Naturopath; Insurance status: Uninsured. Totals for each category may not sum to total sample size due to non-response. Percentages represent percentages over a total of 179 respondents.

RESULTS

The four PTOs who agreed to take part in the survey were not able to identify an exact number of parents they distributed the survey to since social media and school newsletters were used as methods of distribution. An estimate of approximately 900 parents were invited to take the survey, with a 19.8% response rate (179 parents), comparable to other surveys assessing attitudes of parents regarding the influenza vaccine.²¹ Additionally, this provided a 6.56% margin of error at a 95% confidence interval, thus demonstrating that the sample generally represents the population. Most respondents were female (88.3%) and White (92.7%). The majority of the respondents held at least a bachelor’s degree or higher (79%), had private insurance (83.8%), and earned an annual salary higher than \$74,999 (82.1%; Table 1).

Table 1. Characteristics of survey respondents.

	n = 179	n (%)
Gender		
Female	158	88.3
Male	18	10.1
Mean age [SD]	46.5	[7.9]
Race/ethnicity		
White	166	92.7
Marital status		
Married	145	81
Divorced or separated	22	12.3
Annual household income range		
Less than \$74,999	32	17.9
\$74,999 - \$100,000	29	16.2
\$100,000 or greater	92	51.4
Employed		
Yes	142	79.3
No	36	20.1
Highest level of education completed		
Associate degree or less	36	20.1
Bachelor’s degree	75	41.9
Graduate or professional degree	66	36.9
Medical insurance		
Private	150	83.8
Public	18	10.1
Children residing with the parent over half the time		
1 child	37	20.7
2 children	79	44.1
3 children	35	19.6
4 children	13	7.3
What type of doctor do you visit		
M.D.	162	90.5

While there was overlap in demographic characteristics among Pro- and Anti-Addition parents, there were several categories with statistically significant differences (Table 2). Respondents with private insurance were more likely to be Pro-Addition than Anti-Addition (91.3% versus 75.9%; $p = 0.024$). Furthermore, Pro-Addition respondents were more likely to make \$100,000 or more annually (62%) than Anti-Addition (40.2%; $p = 0.004$). Lastly, Pro-Addition respondents were more likely to have fewer children compared to Anti-Addition respondents (30.4% versus 10.3% have 1 child; $p = 0.003$).

Table 2. Differences in characteristics of Pro-Addition vs. Anti-Addition.

Characteristics	Pro-Addition n = 92 (51%)	Anti-Addition n = 87 (49%)	p value
Gender			0.43
Female	81 [88.0]	77 [88.5]	
Male	11 [12.0]	7 [11.5]	
Race			0.33
White	87 [94.6]	79 [90.8]	
Marital status			0.41
Married	75 [81.5]	70 [80.5]	
Divorced or separated	13 [14.1]	9 [10.3]	
Highest level of education completed			0.061
Associate degree or less	13 [14.1]	23 [26.4]	
Bachelor's degree	39 [42.4]	36 [41.4]	
Graduate or professional degree	40 [43.5]	26 [29.9]	
Insurance status			0.024
Private	84 [91.3]	66 [75.9]	
Public	6 [6.5]	12 [13.8]	
Type of doctor visited			0.18
M.D.	84 [91.3]	78 [89.7]	
Annual household income range			0.004
Less than \$74,999	9 [9.8]	23 [26.4]	
\$74,999 - \$100,000	14 [15.2]	15 [17.2]	
\$100,000 or greater	57 [62.0]	35 [40.2]	
Employed			0.88
Yes	73 [79.3]	69 [79.3]	
No	19 [20.7]	17 [19.5]	
Children residing with the parent over half the time			0.003
1 child	28 [30.4]	9 [10.3]	
2 children	44 [47.8]	35 [40.2]	
3 children	13 [14.1]	22 [25.3]	
4 children	4 [4.3]	9 [10.3]	

Table 3 aims to compare the attitudes of Pro-Addition and Anti-Addition respondents using 2 Likert-type scales. One of them ranging from 1 (strongly disagree) to 5 (strongly agree), and the other Likert-type scale ranging from 1 (not at all concerned) to 5 (extremely concerned). Interventions geared toward making vaccinations more accessible, such as scheduled locations and time for children to receive them, only increased the likelihood of Pro-Addition respondents (3.6, $SD = 1.39$ versus 1.4, $SD = 0.8$, $p < 0.001$). Pro-Addition parents also were more likely to trust the information they receive about shots than Anti-Addition parents, with scores of 4.4 ($SD = 0.73$) and 2.1 ($SD = 1.36$), respectively ($p < 0.001$), and also believe that a required shot list is an important health policy, with scores of 4.7 ($SD = 0.45$) and 2.5 ($SD = 1.55$), respectively ($p < 0.001$).

With respect to reasons for opposing the addition of mandatory influenza vaccination, concern for side effects was significantly higher in the Anti-Addition cohort. Anti-Addition parents were more likely to be concerned for side effects from any type of shot in general and also from the influenza vaccine specifically: General Vaccine Side Effects: 4.7 ($SD = 0.44$) versus 2.4 ($SD = 0.98$, $p < 0.001$); Influenza Vaccine Side Effects: 3.93 ($SD = 1.31$) versus 1.7 ($SD = 0.79$, $p < 0.001$).

Respondent attitude towards mandatory influenza vaccination impacted the likelihood of obtaining a “safe and effective” COVID-19 vaccination for their children. Nearly all Pro-Addition respondents would allow their children to obtain such a vaccination versus less than a quarter of Anti-Addition respondents (96% versus 24%, $p < 0.001$).

DISCUSSION

Forty-nine out of 50 states, including Kansas, have fallen short of the Healthy People 2020 goal of 80% influenza vaccination coverage for school-aged children.⁶ Effective and efficient plans are needed to curb the public health risks that come with a lack of vaccination coverage in schools and communities. Attitudes toward vaccination are particularly important during the current COVID-19 pandemic, as hopes are hinged on safe and effective vaccines. Kansan suburban parents of K-12 students were surveyed on their attitudes toward: (1) the addition of the influenza vaccine to the required list, and (2) their likelihood to obtain, if it existed, a “safe and effective” COVID-19 vaccination for their children. Nearly half of respondents were opposed to the addition of the influenza vaccine to the required list. Only 24% of the Anti-Addition parents would allow their children to receive a “safe and effective” COVID-19 vaccination. Anti-Addition parents do not trust the information they receive about shots. They disagree with the importance of a required vaccine list for children, they have significantly greater concerns about vaccination side effects, and were unlikely to allow their children to obtain a coronavirus vaccine, even if it was “safe and effective”.

From our study, Pro-Addition parents had higher incomes compared to Anti-Addition parents, which contradicted prior findings regarding vaccine hesitancy by the CDC National Institute Surveys.^{9,10} Interestingly, finances, a common hypothesized barrier to vaccinations,^{13,22} did not appear to be significant contributors to Anti-Addition parents' intended actions. Therefore, Anti-Addition parents have stronger reasons than just financial barriers, limiting them from adding the influenza vaccine to the required list for children.

Table 3. Differences of perceptions and attitudes regarding vaccinations between Pro-Addition and Anti-Addition respondents.

Survey Question/Statement and Answer Scale	Pro-Addition n = 92 (51%) Mean [SD]	Anti-Addition n = 87 (49%) Mean [SD]	p value % of All Cases
Items 1 - 7 were recorded from 1 (strongly disagree) to 5 (strongly agree).			
1. I am more likely to support the addition if the State provides the flu shot for free for my child.	3.2 [1.33]	1.3 [0.71]	< 0.001
2. I am more likely to support the addition if there is a scheduled location and time for my child to get vaccinated at the school.	3.6 [1.39]	1.4 [0.80]	< 0.001
3. I am more likely to support the addition if the State provides flu shots for the parents as well.	3.2 [1.31]	1.3 [0.52]	< 0.001
4. State funded flu shots would be a wise use of the state's resources and finances.	3.9 [1.08]	1.4 [0.92]	< 0.001
5. Children get more shots than are good for them.	1.5 [0.78]	3.9 [1.49]	< 0.001
6. I trust the information I receive about shots.	4.4 [0.73]	2.1 [1.36]	< 0.001
7. A required shot list for children is an important health policy.	4.7 [0.45]	2.5 [1.55]	< 0.001
Items 8 - 9 were measured from 1 (not at all concerned) to 5 (extremely concerned).			
8. How concerned are you that your child might have a serious side effect from a shot?	2.3 [0.98]	4.7 [0.44]	< 0.001
9. How concerned are you that the flu shot in particular will not be safe?	1.7 [0.79]	3.93 [1.31]	< 0.001
The BRIEF tool measured with 1 = Inadequate Literacy, 2 = Marginal Literacy, and 3 = Adequate Literacy			
10. BRIEF Tool: Confidence in Health Literacy	2.8 [0.44]	2.9 [0.44]	0.567

Table 4. Coronavirus pandemic impact on parental attitudes toward vaccines.

	Pro-Addition* n = 92 (51%)	Anti-Addition* n = 87 (49%)	p value
If there was a safe and effective COVID-19/coronavirus vaccine available, would you allow your child to get it?			< 0.001
Yes	88 (96%)	21 (24%)	10.31
No	0 (0%)	53 (61%)	9.04
Undecided	4 (4%)	13 (15%)	5.83
The coronavirus pandemic has made my attitude more favorable towards my child and I receiving shots.			< 0.001
Scale from 1 (strongly disagree) to 5 (strongly agree)	3.3 [1.3] [†]	1.6 [0.88] [†]	

*Percent of respondents per item out of the total sample.

[†]Mean [SD]

Anti-Addition parents distrusted information received about vaccines. This conflicted with other studies showing that Health Care Providers (HCP) generally are reported as reliable sources of information for parents regarding vaccines.^{23,24} These studies, however, did not focus on suburban parents specifically. This reveals distinct factors could exist among our population causing there to be distrust between parents and HCPs. Further investigation is warranted to assess different sources of distrust for HCPs among suburban parents.

A key finding from the survey showed that Anti-Addition parents were significantly less likely to allow their child to get the COVID-19 vaccine even if it was reported safe and effective. This is alarming for HCPs to see as COVID-19 vaccine production is underway in multiple countries. This vaccine is viewed as an integral piece for society to move forward from the pandemic; however, if large proportions of the state, such as suburban parents, have significant numbers of parents unwilling to consent themselves and their children to such a vaccine, then HCPs' efforts will be undermined. The success of creating a safe and effective coronavirus vaccine will be an amazing achievement, but only half the battle will be won. A vaccine is only as effective

as the amount of people it reaches. This vaccine will play a crucial role in our communities and schools to return to relative normalcy. However, much work is needed investigating effective manners and strategies into curbing the concerns of suburban parents so the vaccine can achieve its full potential.

To our knowledge, this is the first study that assessed the effects of the COVID-19 pandemic on suburban parental attitudes towards vaccines. Anti-Addition parents' views towards vaccinations have not become more positive since the onset of the coronavirus pandemic. Ninety-six percent of Pro-Addition parents would accept a "safe and effective" COVID-19 vaccination for their children versus only 24% of Anti-Addition parents. It is important to note that data collection took place prior to reports of children experiencing Kawasaki Disease²⁵ and multiorgan system inflammatory response, when it was believed that children largely were spared from severe COVID-19 sequelae. It is possible that attitudes towards COVID-19 vaccination may have changed.

Primary limitations seen in this study were a potential lack of external validity due to recruitment only taking place in Johnson County.

However, when comparing our sample demographics to Johnson County parents as a whole, there were strong similarities. Therefore, internal validity was intact. An additional limitation to the study could be a bias of respondents having extreme views. Since survey distribution was primarily through parent-teacher organization e-mails and newsletters, it is possible that the parents who chose to respond were parents who had stronger attitudes towards vaccines. This was a cross-sectional, survey-based study which limited our ability to analyze any data over time and establish cause and effect. To gain further insight, follow-up qualitative studies of Anti-Addition parents are planned, particularly as it relates to attitudes and health behaviors during the ongoing COVID-19 pandemic.

CONCLUSIONS

Suburban parents were split markedly on their attitudes towards the addition and the effects of the pandemic. In Johnson County where this study was polled, 30% of the population is under 18 years old (181,925 children).¹² If 29.6% of the parents and their children opt out of the COVID-19 vaccine like our study indicated, Johnson County could be missing out on crucial herd immunity. A lack of trust in information among Anti-Addition parents was seen which appeared to not be swayed by lower annual household income or the onset of the coronavirus pandemic. Poor attitudes towards vaccinations appear to stem from a lack of trust in information received and a concern for adverse side effects. Future qualitative studies to understand the perspectives of parents who distrust and are opposed to vaccinations are critical to inform successful vaccine-related public health interventions.

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